



U.S. Department of Energy
Energy Efficiency and Renewable Energy

industrial technologies program

ITP Corporate Peer Review

INDUSTRIAL FINANCING PRACTICES FOR ENERGY EFFICIENCY INVESTMENTS





Issues and Opportunities

- Five areas have been identified as having potential influence on the relationship between U.S. Industry and the Industrial Technologies Program
 - Positive Impact Manufacturing
 - 21st Century Workforce
 - Multi-scenario Planning Analysis
 - Environmental Regulation and Its Impact on Investment
 - Industrial Financing of Energy Efficiency Investments



Session Summaries

- **Positive Impact Manufacturing**
 - This session has two major objectives; first, to raise the image of manufacturing in the eye of the public - emphasizing that manufacturing is a future-oriented business, not the commonly-held “smokestack” stereotype, and second, to promote a recognition among the public and policy makers that manufacturing can meet societal goals along with corporate goals.
- **21st Century Workforce**
 - One of the most important issues facing manufacturers today is the scarcity of technically skilled production workers in the manufacturing sector. This session will provide background on the current situation and actions underway.



Session Summaries

- Multi-scenario Planning Analysis
 - Strategic planning is typically conducted under the expectation that past trends will continue into the future. How robust are ITP's strategies if the world shifts in an unexpected direction? This session will explore scenario planning as a tool to guide the actions of ITP to meet a range of contingencies.
- Environmental Regulation and Its Impact on Investment
 - Environmental regulations impact manufacturing operations technically and financially. The presenters in this session will discuss various environmental issues and explore how different environmental drivers might impact EERE-ITP program planning strategies



Session Summaries

- Financing of Energy Efficiency Investments
 - This session reviews how energy efficiency investment choices are viewed in a capital-scarce environment and the factors that influence the investment decision. Financing options, and the perspectives of end-users and equipment suppliers are discussed.



Discussion Topics

- ✓ Is financing an issue that ITP should be concerned with as we move forward?
- ✓ Is the way ITP is approaching financing of energy efficiency investments correct?
- ✓ Is the ITP plan flexible enough to accommodate changes in industrial financing practices over time?



Panel Objectives

- Reveal how investment choices are viewed within a capital-scarce environment and the factors that influence the investment decision
- Review financing options and the perspectives of end-users and equipment suppliers



Introductions

- Industrial Technologies Program
 - Elliott Levine, Glass Technology Manager and Industry Liaison
- Panel Members
 - Michael Lukasiewicz, Partner, Marketing CrossRoads, Inc.
 - Peter Garforth, Principal, Garforth International LLC
 - Bob Newell, Industrial Energy Market Manager, Siemens Westinghouse Power Corporation



Agenda

- Energy Efficiency Investment Opportunities
- Financing Practices
- Panelist Presentations



Energy Efficiency Investment Opportunities

- Traditional efficiency investments
 - Proven technology
 - Record of performance of energy efficient products
 - Products from established firms
 - Documented benefits of productivity improvements and energy savings
 - Demonstrated return on investments
- Investments in advanced technology
 - Emerging technology
 - Large projected benefits
 - Limited record of performance



Traditional Energy Investments

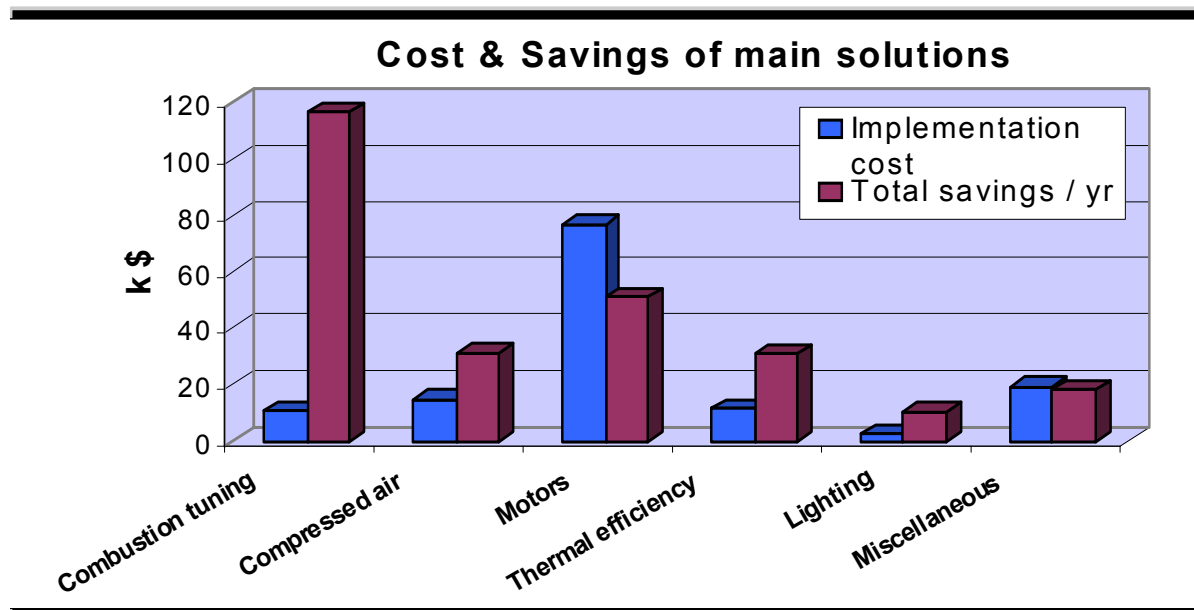
- Most investments in energy efficiency involve the installation of new systems or technologies or the retrofit of existing equipment.
- Plant Wide Assessments and tools from DOE aid investment decision making.
 - Replicate success throughout corporation at multiple facilities.

Process controls
High-efficiency boilers
Cogeneration
Waste heat recovery boilers
Insulation
Energy/load management systems
High-efficiency motors/adjustable speed drives
High-efficiency lighting
Instrumentation
Power factor correction systems
Stream traps



Traditional Energy Investments

- Range of payback periods for these energy investments can be less than one year to almost seven years.
 - Financing from outside sources is an option for projects with long paybacks.
 - Corporate funds often pay for solutions with paybacks of less than one year.



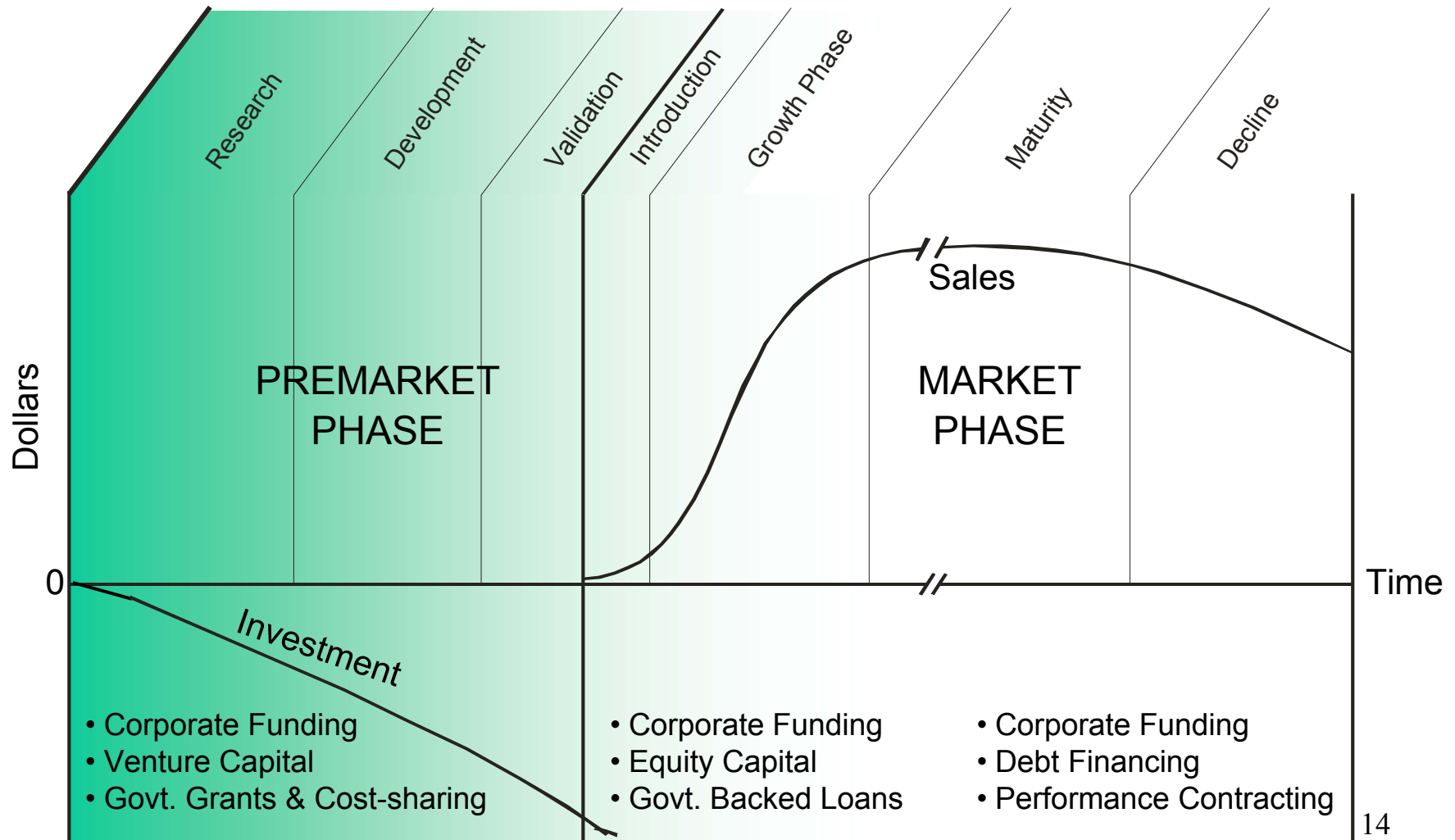


Investment Opportunities in Advanced Technologies

- Industrial Technology Program impacts industrial investments in advanced technologies:
 - Demonstrate performance and reduce uncertainties through cost-shared R&D projects
 - New technology development projects.
 - Verification to provide engineering data.
 - Validation initiatives delivers end-user benefit information.
 - Document and communicate benefits to decision makers
 - Fact sheets, case studies



Matching Opportunity with Source of Funds





Industrial Financing

- Decision making
- Financial analysis
- Types of funding
- Barriers
- End-User and Supplier Perspectives



Energy Saving Projects: Capital and Operating Expenses

Capital Budget Items

- Major equipment
- Real property
- Roofs/windows
- Trucks/automobiles
- Factory machinery

Operating Budget Items

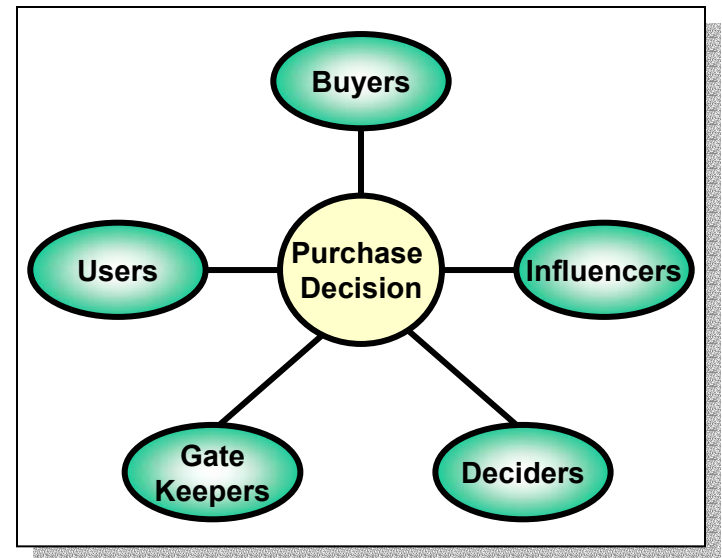
- Supplies
- Utility bills
- Salaries
- Maintenance
- Service contracts

Operating expense impacts financial analysis of capital investment.



Decision Making

- Industrial expenditure decisions usually involve the interaction of multiple people in an organization.
 - For large capital expenditures, the decider is a high level executive.
 - An individual can play multiple roles in the decision making process
 - Financial aspects of the project are a primary factor in a decision.
 - Market, business and financial factors are interdependent.





Capital Spending Decisions at Hypothetical Steel Co.

<u>Projects</u>	<u>Capital Cost</u>
Furnace	\$600,000
Ladle	\$300,000
Handling system	\$800,000
Computer system	\$3,000,000
Annealing oven	\$1,000,000
Advanced annealing oven	\$2,000,000
Rolling mill equipment	\$2,000,000
New Product Development	\$4,000,000

Financial analysis helps sort through options.



Financial Analysis

- Why Perform Financial Analysis?
 - Compare investment options
 - Determine timing of investment
 - Adds objectivity to decision making
 - Forces understanding of business processes
- Three Most Common Financial Evaluation Methods

- ✓ Payback
- ✓ Internal rate of return (IRR)
- ✓ Net present value (NPV)



Financial Analysis at Hypo Steel

Projects	Investment (\$1000)	Pay- back	IRR	NPV (\$1000)
Furnace	\$600	0.8	82.5%	\$1,068
Ladle	\$300	1.2	56.7%	\$500
Handling system	\$800	1.5	11.3%	(\$9)
Computer system	\$3,000	1.8	-5.2%	(\$579)
Annealing oven	\$1,000	2.5	31.3%	\$641
Rolling mill equipment	\$2,000	3.8	21.1%	\$626
Advanced annealing oven	\$2,000	4.0	26.9%	\$855
New Product Development	\$4,000	5.0	22.1%	\$1,012

Note: Calculations for presentation purposes only.



Analysis Options

Method	Advantages	Disadvantages
Payback	<ul style="list-style-type: none">• Simple calculation method	<ul style="list-style-type: none">• Lacks the time value of money.• Accepts many short lived projects and rejects many long lived projects.
Internal Rate of Return (IRR)	<ul style="list-style-type: none">• A discounted cash flow method accounting for time value of money.	<ul style="list-style-type: none">• Unreliable at ranking projects of different scale.• Misleading if choosing from mutually exclusive projects.
Net Present Value (NPV)	<ul style="list-style-type: none">• A discounted cash flow method.• Findings are additive; can evaluate multiple project options.• Avoids problems of payback & IRR.	<ul style="list-style-type: none">• Complex calculation method



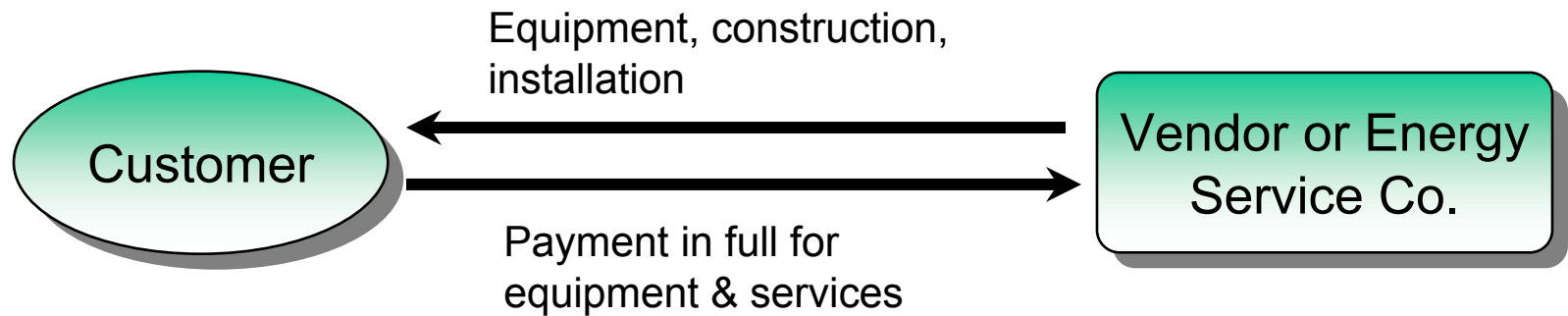
Key Elements of Financial Analysis

- Initial Investment
 - Total project capital cost.
- Cash flow forecast
 - Identify ongoing revenues and costs associated with project.
- Cost of capital
 - Higher the risk, higher the cost of capital.
- Life of the investment
 - Life cycle costs and residual value.

**After the investment decision is made.....
Where do you get the money?**



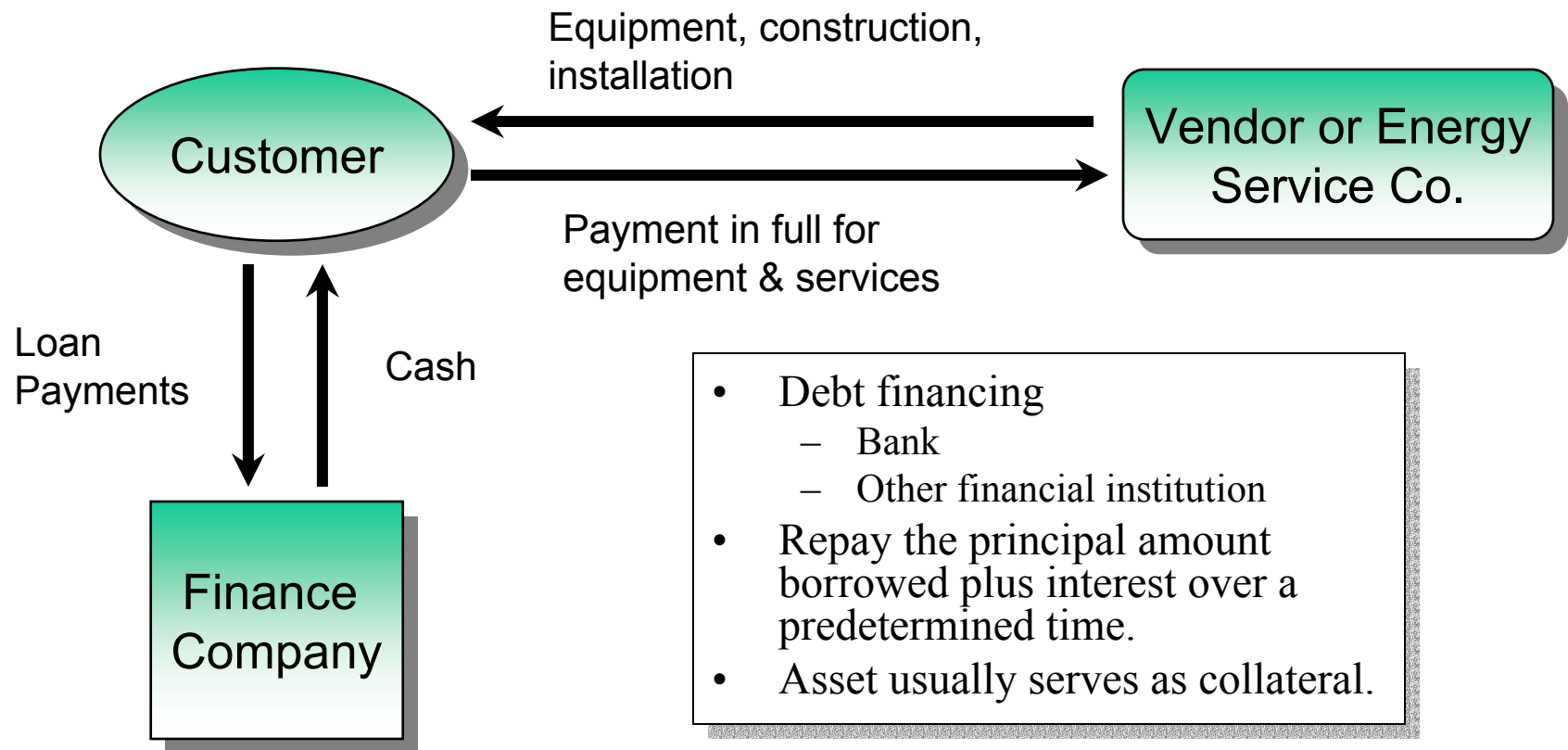
Funding Equipment Purchases



- Sources of Cash
 - Cash flow from operations
 - Equity financing
 - Equity markets
 - Venture capital
 - Debt financing
 - Bank financing
 - Commercial paper

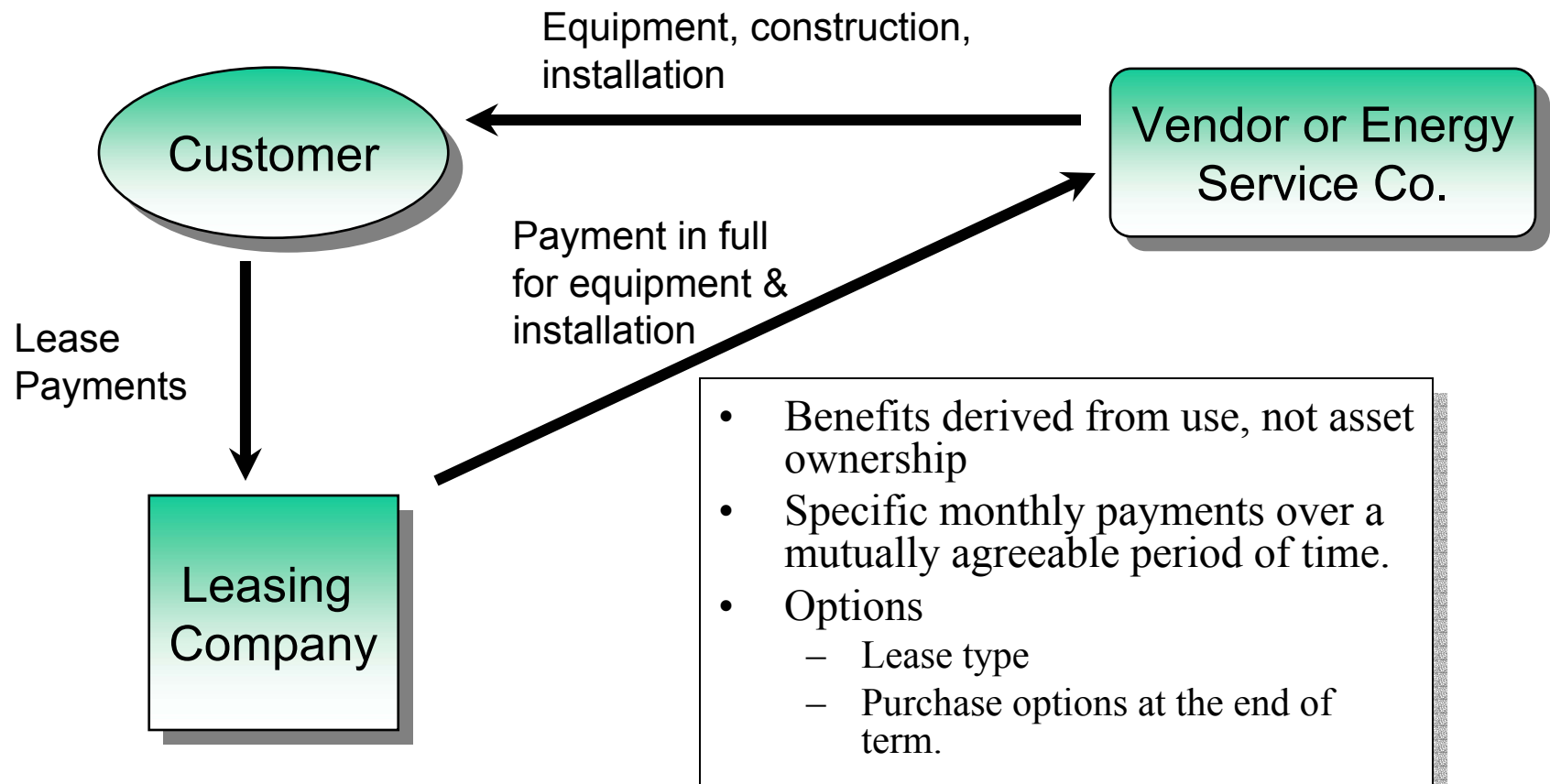


Loan Financing



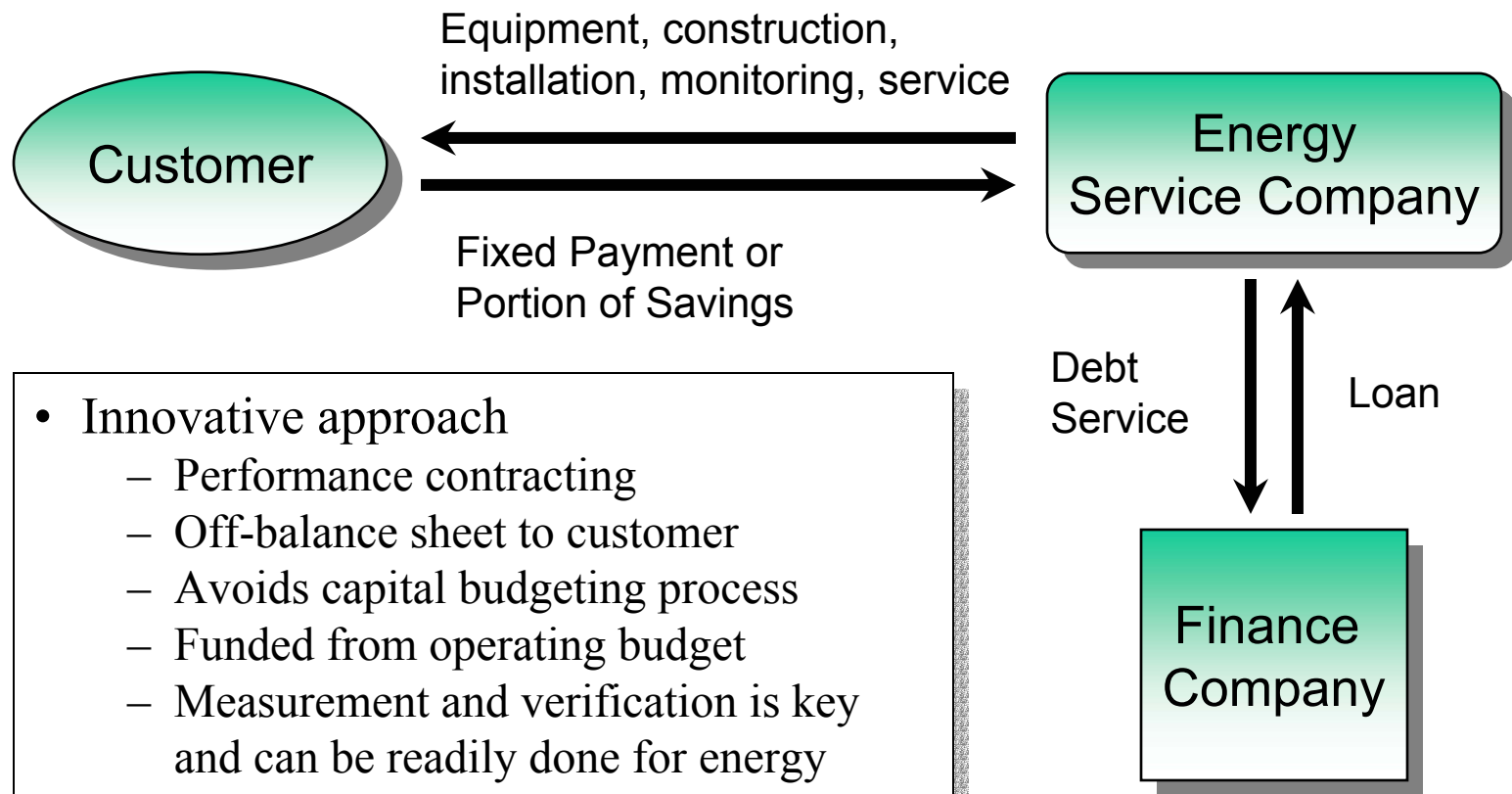


Lease Financing





Performance Based Financing





Financing Options Summary

	Cash Purchase	Bank Loans	Lease	Performance Contracting
Advantages	<ul style="list-style-type: none">• No finance charges.• Ownership of the asset.• Depreciation benefits.	<ul style="list-style-type: none">• Own the equipment• Asset on balance sheet.• Depreciation benefits.	<ul style="list-style-type: none">• Preserves bank and credit lines.• Protected from equipment obsolescence.• Leasing provides a hedge against inflation.	<ul style="list-style-type: none">• No up-front outlay of cash.• Technical risks minimized.• Guaranteed operating and energy savings.
Disadvantages	<ul style="list-style-type: none">• Reduces investment leverage and cash flow.• No hedge against inflation.• Assume equipment obsolescence risk.	<ul style="list-style-type: none">• Assets as collateral.• Down payments and/or origination fees.• Reduce credit lines.• Assume equipment obsolescence risk.	<ul style="list-style-type: none">• Non-cancelable agreement.• Additional costs; fees, insurance.	<ul style="list-style-type: none">• Requires measurement and verification.• Financing costs.• Default risk with service company.

Resource: www.sba.gov

**Innovative Financing Approaches Combine
Features of the Different Funding Options**



Government Financing Programs Supplement Private Investment

- Debt
 - Loans, loan guarantees, and other options.
- Equity
 - SBA investments
- Tax Incentives
 - State and local governments offer most of the tax incentives to promote manufacturing
- Grants and Cost-Shared Programs
 - Direct transfers of money to the recipient, usually with no payback obligation.
 - Cooperative agreements; DOE cost-shared programs.
 - Plant wide assessments
 - Share best practice information
 - Allow for replication of energy savings at other plants
- Federal Energy Management Program – Financial Assistance
 - Energy Saving Performance Contracts for federal facilities



External Funding Barriers

- Risk and uncertainty
 - Regulations and institutional policies guide funding decisions.
 - Capabilities of company
 - management
 - operations and maintenance
 - Credit quality of company
 - Quality of the contracts
 - Capabilities of equipment
 - Capabilities of vendor and installation contractor
- Lack of experience with new technology
- Environmental liabilities

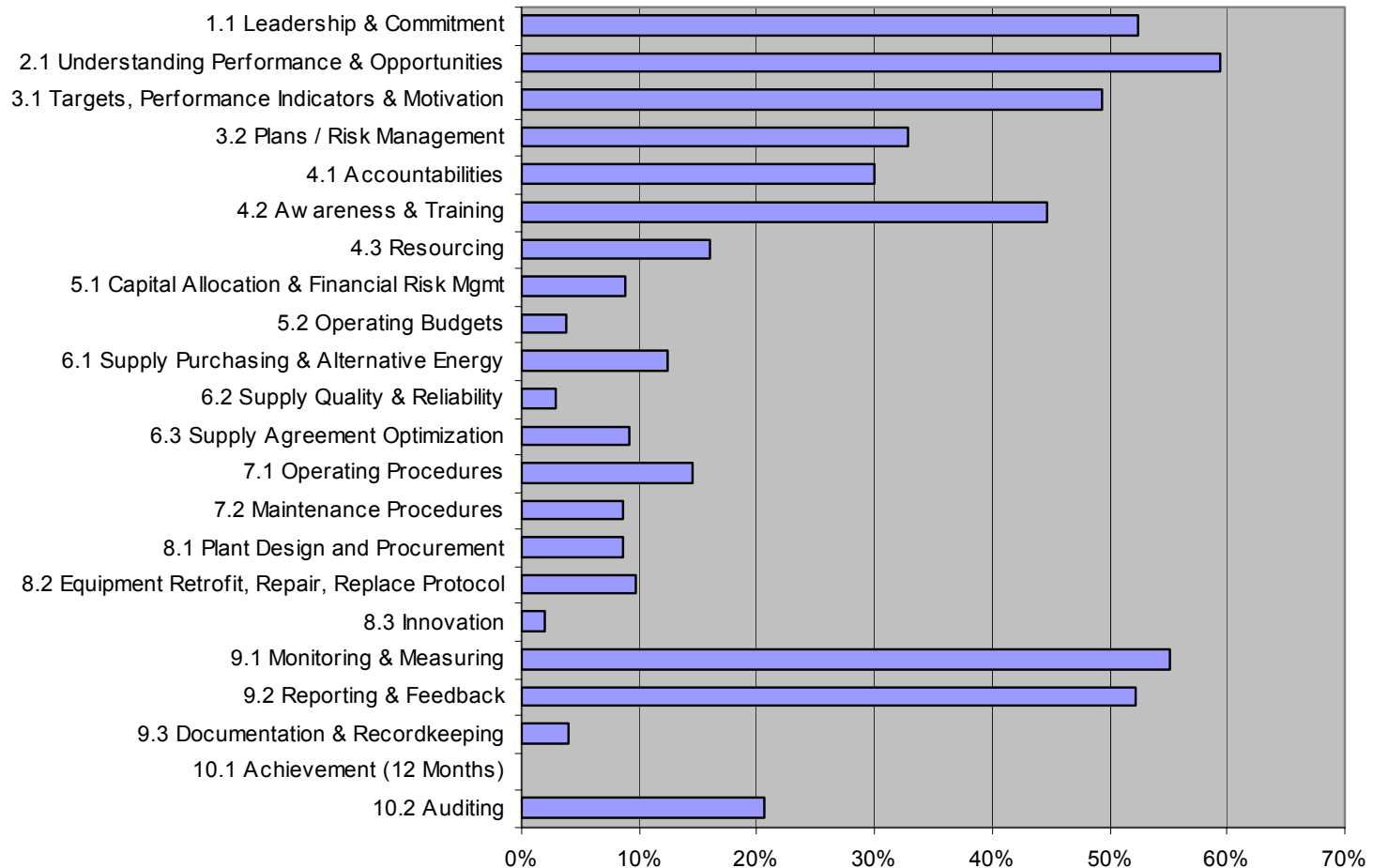


Internal Funding Barriers

- Competing projects
- Hurdle rates
- Cash flow
- Limited capital dollars available
 - Capital allocation for projects is relatively minor obstacle at large firms.
- Risk and uncertainty
 - Lack of information about technical and financial performance is one of the biggest barriers to implementing energy efficiency projects.



Critical Actions for Efficiency Investment Decisions



*Source: Results of 1-2-5 Energy Management Audit of large industrial energy users, Envinta Corporation, www.envinta.com



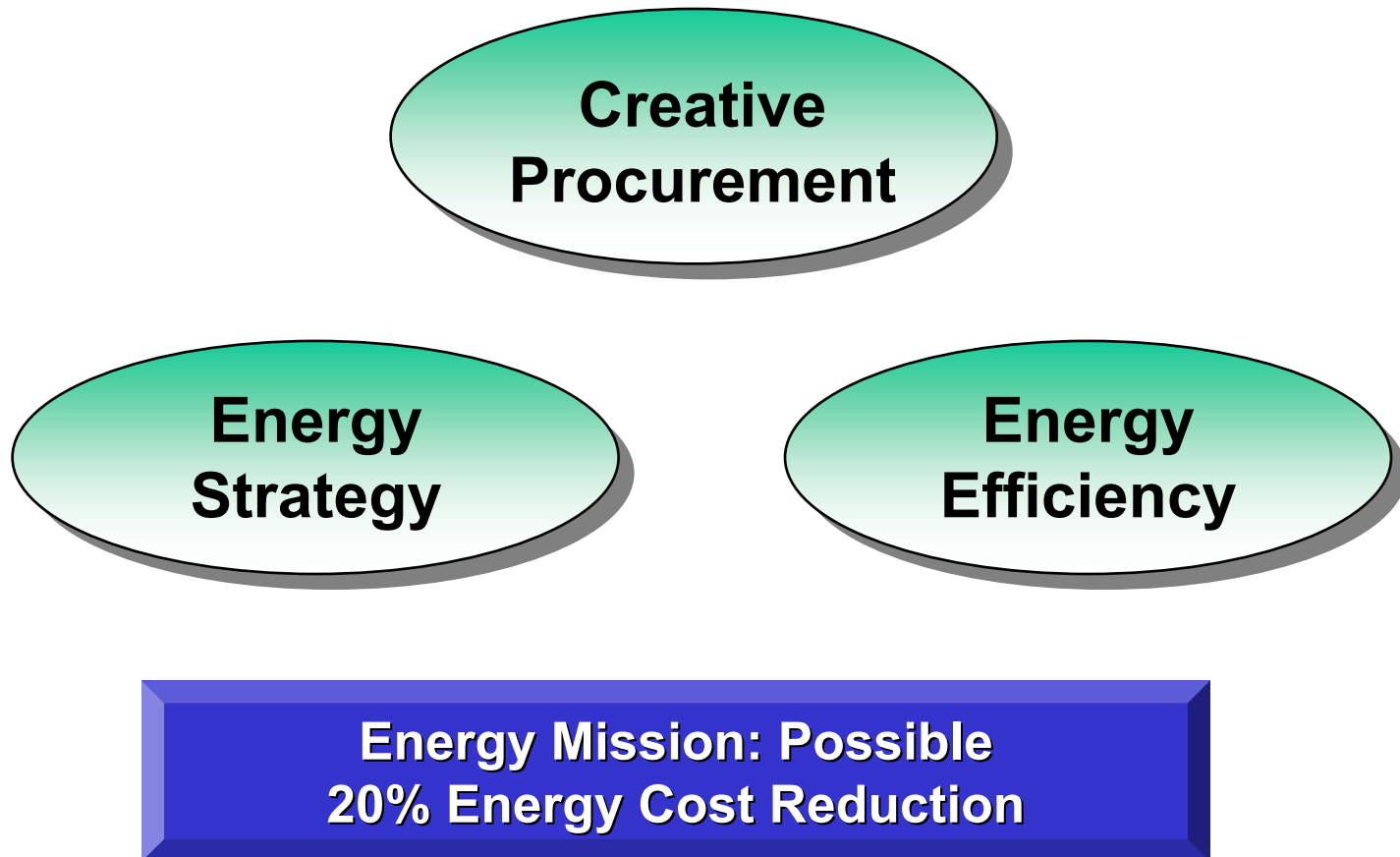
End-User Perspective

- Peter Garforth, Principal, Garforth International LLC
 - Former VP Strategy and Business Development, Owens Corning
 - Owens Corning Energy Management Strategy
 - Overcoming barriers
 - Successes





Owens Corning Strategy Initiated in 1999





Many Barriers to Implementation are Not Financial

- Our energy buyers have got the best deals...
- Our engineering is 100% perfect and here's the reams of data to prove it.
- It's been OK for 50 years ..why change?...
- We can't have strangers touch the process...
- You're in marketing....
- The leadership isn't serious...
- Someone tries this about every five years...
- We know what needs to be done, but the investment is always rejected...

This too shall pass !!!



Overcoming Barriers....First

- Resolve Investment Mindset
 - Past - conflict between investing in the “business” or “productivity”
 - Energy world has changed - market liberalisation opened competition
 - ESCOs ready to invest in return for a share of cost savings
 - OC looked for 2 to 4 year paybacks
 - They looked for 4 to 7 year paybacks
 - 1999 OC closed innovative \$2.4Bn energy services contract
 - Covered all energy procurement
 - ESCo was investor/manager:
 - 2001 OC formed own ESCo

Freed up the energy investment thinking..



Overcoming Barriers....Second

- Involve Employees
 - Report monthly - simple measurements
 - Energy Use/unit of saleable product
 - Energy cost/unit of saleable product
 - Energy cost/facility
 - Sites invited to form Energy Mission: Possible teams
 - “Energy Mission: Possible Idea of the Month” programme with annual awards
 - Share and celebrate successes

Sustained Management Commitment



Be creative and have fun...

How to visualize Negawatts!



Autumn 2002 in Indian plant



2003 Results to Date....

- \$35M Annual energy cost savings
 - Procurement savings of \$10M
 - Employee teams saving \$6M/year
 - Invested in efficiency projects yielding \$19M/year energy cost reduction with >15% RoI
- Substantial emissions reductions
- Vastly improved employee energy awareness
- At same time - increased production 18%
- Absorbed ~10% energy price increases
- Other productivity gains
 - Quality, waste, safety..
- 2004 estimated \$5M further reductions

Productivity Gain \$80M and more to go!



Energy is a Strategic Resource Requiring Clear View of Future

- Ruthless pursuit of efficiency
 - CEO driven culture – every kWh is valuable
- Plant-of-the Future
 - How to cut process energy costs another 40%?
- Suppliers and Customers
 - Manage energy productivity along the value chain
- Exploit energy assets
 - How can OC's plant be part of a bigger game?
- Embrace Kyoto requirements worldwide
 - System wide spotlight on productivity

Energy Productivity is a Management Muscle



Equipment Supplier Perspective

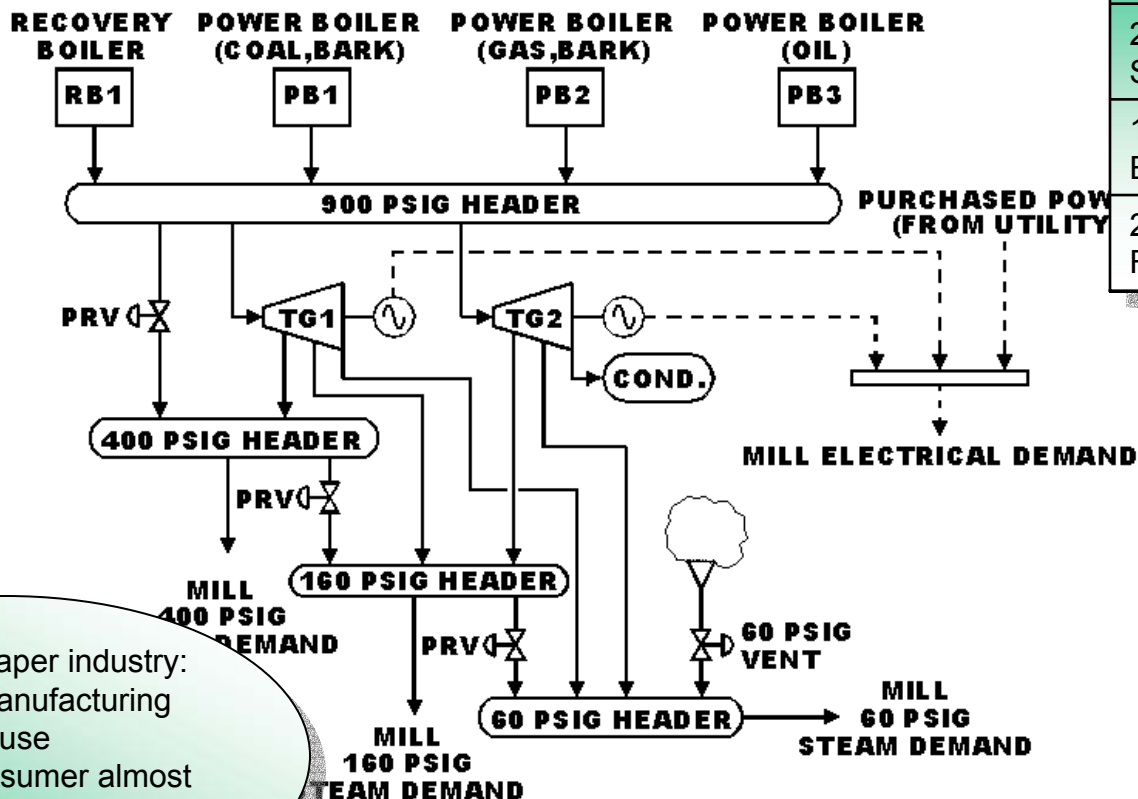
- Bob Newell, Industrial Energy Market Manager, Siemens Westinghouse Power Corporation
 - Energy Efficiency Investment Opportunities in Paper Industry: Paper Mill Power House
 - Energy Savings Potential with Integrated Energy Management System
 - Collaborative Approaches increase ROI and Reduce Decision-making Risks





Paper Mill Energy Efficiency Opportunity

Power House Schematic



Paper Industry Financial Summary	
2001 Value of Shipments	\$156 B
1999 Capital Expenditures	\$7.5 B
2001 Purchased Fuels	\$7.6 B

- Pulp and paper industry: >15% of manufacturing sector fuel use
- Boilers consumer almost 80% of purchased fossil fuels

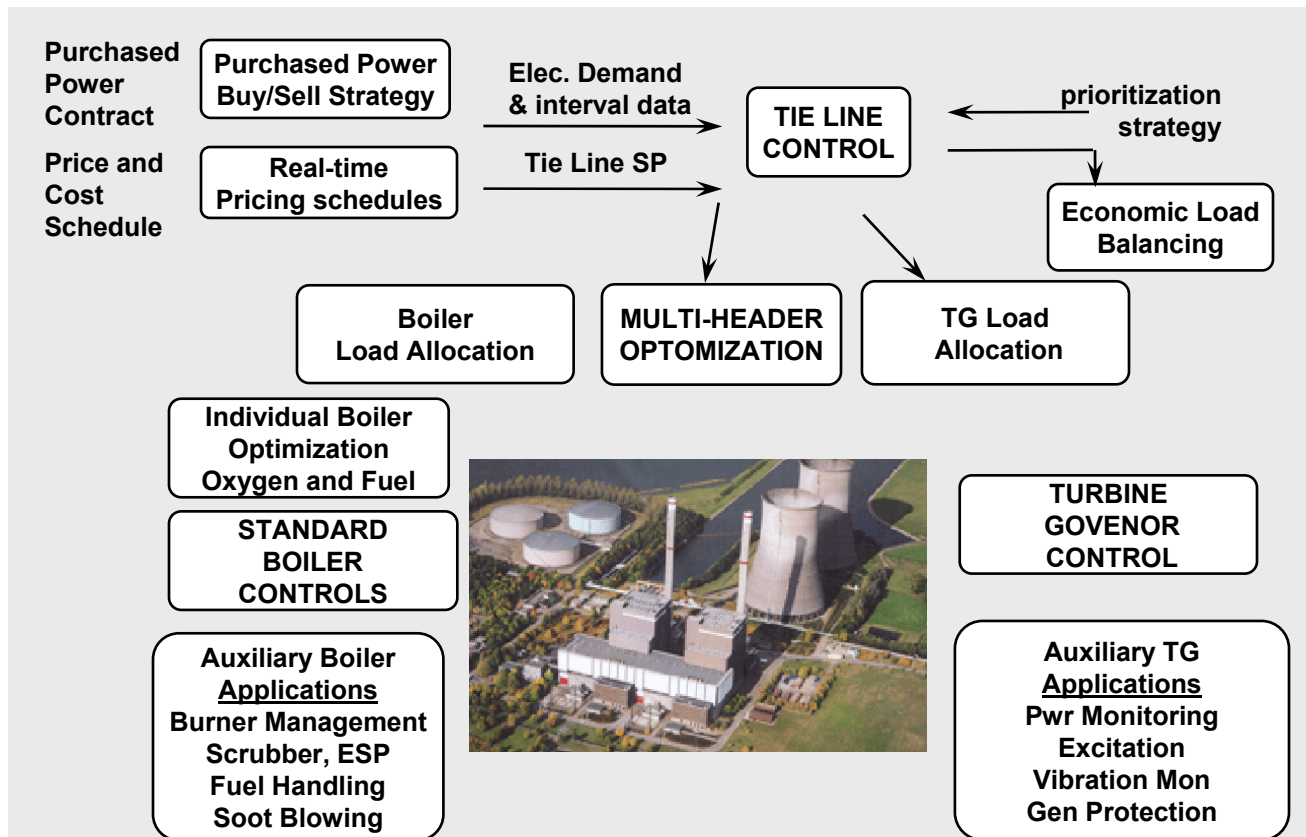


Power House Energy Management Solution

- Integrated Energy Management Systems
 - Optimizes powerhouse operations, minimizes energy costs and emissions, while providing high availability of the steam and electrical resources to the plant
- Benefits of Solution
 - Provide a operating envelope delivering
 - Safe operating conditions
 - Within operating constraints of environment, equipment and process
 - Optimized for reducing the overall cost of energy
 - Designed to maintain a balanced plant operation during normal and abnormal conditions



Energy Management System: Power House Applications





Integrated System Application: Results

Purchased Power		Purchased Power	Elec. Demand
Application		Potential Savings	
Tieline Control (RTP)		\$277,000/annually	
Waste Fuel Optimization		\$204,000/annually	
Minimum excess O2		\$76,000/annually	
Boiler/Fuel Allocation		\$59,000/Annually	
Turbine Load Allocation		\$40,000/ Annually	
Fewer boiler trips		\$38,000/annually	
Fuel Handling Soot Blowing		Vibration Mon Gen Protection	

Plant:
600-1600 KPPH Steam
60-150 MWt Energy
4-15M\$ Energy Cost



Supplier Input to Investment Analysis

Typical

Business
analysis

Investment
analysis

Integrated Solution Advantages

- Project savings
- Establishes pricing and lead time information
- Minimize schedule impact
- Site Standardization
- Integration optimization
- True value engineering
- Leverage efficiencies across systems / process
- Optimizes resources
- Pre-established post project support services

Strategic supplier alliance minimizes risk and improves return on energy efficiency investment

Siemens

Generate

in &
ce

ators

Life Cycle
Services



Summary

- Many financing options are available once the decision has been made to invest in an energy efficiency project.
- Risk and uncertainty are two of the most important factors determining the availability of financing.
- Government's role is to reduce risks associated with business investment in energy efficient technologies.
- Many barriers to implementation of energy efficiency investments are not financial.
- Strategic alliances between end-users and equipment suppliers minimize risk and improve return on energy efficiency investment.